What is claimed is:

1. A rotor head for a rotary-wing aircraft having a plurality of rotor blades and a drive shaft, the rotor head comprising:

a gimbal mechanically coupled to the drive shaft so that the gimbal rotates with the drive shaft;

a hub pivotally coupled to the gimbal for receiving the rotor blades; and

an actuator mechanically coupled to the hub for causing the hub to pivot about the gimbal.

2. The rotor head of claim 1, further comprising a swash plate assembly mechanically coupled to the actuator and the hub so that the actuator exerts a force on the swash plate assembly that causes the hub to pivot about the gimbal.

3. The rotor head of claim 2, wherein the swash plate assembly comprises a rotating swash plate fixedly coupled to the hub, and a non-rotating swash plate rotatably coupled to the rotating swash plate and pivotally coupled to the actuator.

4. The rotor head of claim 2, wherein the swash plate assembly further comprises a plurality of ball bearings and the rotating swash plate rotates in relation to the non-rotating swash plate by way of the bearings.

5. The rotor head of claim 1, further comprising a plurality of ball bearings, wherein the hub pivots in relation to the gimbal by way of the ball bearings.

6. The rotor head of claim 5, wherein the hub has a plurality of grooves formed in an inner circumferential surface thereof, the gimbal has a plurality of grooves formed in an outer surface thereof, each of the grooves formed in the inner circumferential surface of the hub faces a corresponding one of the grooves formed in the gimbal to form a race for receiving one of the ball bearings.

7. The rotor head of claim 1, wherein the actuator is a screw jack.

8. The rotor head of claim 2, wherein the actuator is a screw jack, the drive shaft extends through a collar, a first end of the actuator is pivotally coupled to the collar, and a second end of the actuator is pivotally coupled the swash plate assembly so that expansion of the actuator causes the hub to pivot about the gimbal in a first direction and retraction of the actuator causes the hub to pivot about the gimbal in a second direction.

9. The rotor head of claim 2, wherein the swash plate assembly is fixedly coupled to a first side of the hub, and the rotor head further comprises a spring that contacts a second side of the hub and urges the hub toward the swash plate assembly.

10. The rotor head of claim 2, further comprising a second swash plate for varying a pitch of the rotor blades.

11. The rotor head of claim 2, wherein the inner circumferential surface of the hub defines central opening for receiving the gimbal.

12. The rotor head of claim 1, wherein the actuator can lock the hub in a particular orientation in relation to the drive shaft.

13. A rotor head for a rotary-wing aircraft having a plurality of rotor blades and a drive shaft, the rotor head comprising:

a gimbal secured to the drive shaft;

a hub pivotally coupled to gimbal and comprising a plurality of sleeves for receiving the rotor blades;

a swash plate assembly having a first portion secured to the hub; and

a screw jack mechanically coupled to a second portion of the swash plate assembly so that extension and retraction of the screw jack causes an orientation of the swash plate assembly and the hub to change in relation to the drive shaft.

14. The rotor head of claim 13, wherein the first portion of the swash plate assembly is rotatably coupled to the second portion of the swash plate assembly by a plurality of ball bearings.

15. The rotor head of claim 13, wherein the drive shaft rotates within a collar, a first end of the screw jack is pivotally coupled to the collar, and a second end of the drive shaft is pivotally coupled to the second portion of the swash plate assembly.

16. The rotor head of claim 13, wherein the hub is pivotally coupled to the gimbal by a plurality of ball bearings.

17. The rotor head of claim 16, wherein the hub has a plurality of grooves formed in an inner circumferential surface thereof, the gimbal has a plurality of grooves formed in an outer surface thereof, each of the grooves formed in the inner circumferential surface of the hub faces a corresponding one of the grooves formed in the gimbal to form a race for receiving one of the ball bearings.

18. The rotor head of claim 13, further comprising a second swash plate for varying a pitch of the rotor blades.

19. The rotor head of claim 13, wherein the first portion of the swash plate assembly is secured to a first side of the hub, and the rotor head further comprises a spring that contacts a second side of the hub and urges the hub toward the swash plate assembly.

20. The rotor head of claim 13, wherein the screw jack locks the angular position of the swash plate assembly and the hub in relation to the drive shaft when the screw jack is deactivated.

21. A rotor assembly for a rotary-wing aircraft, comprising:
a plurality of rotor blades;
a drive shaft; and

a constant-velocity joint mechanically coupling the rotor blades to the drive shaft, wherein the constant velocity joint is restrained from pivoting in relation to the drive shaft by an actuator and a swash plate assembly.

22. The rotor assembly of claim 21, wherein the constant-velocity joint comprises a gimbal coupled to the drive shaft so that the gimbal rotates with the drive shaft; a hub having a plurality of sleeves for receiving the rotor blades, and a plurality of ball bearings for pivotally coupling the hub to the mast.

23. A rotor head for a rotary-wing aircraft having a plurality of rotor blades and a drive shaft, the rotor head comprising a gimbal secured to the drive shaft, and a hub comprising a plurality of sleeves for receiving the rotor blades, wherein the hub is mechanically coupled to the gimbal and an actuator and the hub pivots about the gimbal on a selective basis in response to movement of the actuator.

24. The rotor head of claim 23, further comprising the actuator and a swash plate assembly, the swash plate assembly being mechanically coupled to the actuator and the hub so that the actuator exerts a force on the swash plate assembly that causes the hub to pivot about the gimbal.

25. The rotor head of claim 24, wherein the swash plate assembly comprises a rotating swash plate fixedly coupled to the hub, and a non-rotating swash plate rotatably coupled to the rotating swash plate and pivotally coupled to the actuator.

26. The rotor head of claim 23, further comprising a plurality of ball bearings, wherein the hub pivots in relation to the gimbal by way of the ball bearings.

27. The rotor head of claim 26, wherein the hub has a plurality of grooves formed in an inner circumferential surface thereof, the gimbal has a plurality of grooves formed in an outer surface thereof, each of the grooves formed in the inner circumferential surface of the hub faces a corresponding one of the grooves formed in the gimbal to form a race for receiving one of the ball bearings.

28. The rotor head of claim 23, wherein the actuator is a screw jack, the drive shaft extends through a collar, a first end of the actuator is pivotally coupled to the collar, and a second end of the actuator is pivotally coupled the swash plate assembly so that expansion of the actuator causes the hub to pivot about the gimbal in a first direction and retraction of the actuator causes the hub to pivot about the gimbal in a second direction.

29. The rotor head of claim 24, wherein the swash plate assembly is fixedly coupled to a first side of the hub, and the rotor head further comprises a spring that contacts a second side of the hub and urges the hub toward the swash plate assembly.

30. The rotor head of claim 23, where the actuator can lock the hub in a particular angular position in relation to the drive shaft on a selective basis.

31. A method for controlling an angle between a plane of rotation of rotor blades of a rotary-wing aircraft and a drive shaft that transmits torque to the rotor blades, comprising:

providing a constant-velocity joint for mechanically coupling the rotor blades and the drive shaft; and

causing the rotor blades to pivot in relation to the drive shaft by way of the universal joint using an actuator.

32. The method of claim 31, wherein causing the rotor blades to pivot in relation to the drive shaft by way of the universal joint using an actuator comprises causing the rotor blades to pivot in relation to the drive shaft by way of the universal joint using a jack screw.

33. The method of claim 31, further comprising locking the hub and the plane of rotation of the rotor blades in a particular orientation in relation to the drive shaft using the actuator.

34. A method for operating a rotary-wing aircraft having a fuselage, and plurality of rotor blades mechanically coupled to a hub of a rotor head, wherein the rotor blades and the hub rotate in relation to the fuselage, the method comprising altering an angle between a plane of rotation of the rotor blades and the fuselage, and locking a plane of rotation of the rotor blades in a particular orientation in relation to the fuselage.

35. The method of claim 34, wherein altering an angle between a plane of rotation of the rotor blades and the fuselage comprises altering an angle between the plane of rotation of the rotor blades and the fuselage to achieve a desired airspeed for the rotary-wing aircraft.

36. The method of claim 34, wherein locking the plane of rotation of the rotor blades in a particular orientation in relation to the fuselage comprises locking the plane of rotation of the rotor blades in a particular orientation using an actuator mechanically coupled to the hub and a non-rotating component of the rotary-wing aircraft.